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Insights of patients and clinicians on the promise of the experience sampling method for psychiatric care

RUNNING HEAD: PROMISE OF EXPERIENCE SAMPLING FOR PSYCHIATRY

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Highlights.

- Patients and clinicians are open to implementation of experience sampling methodology (ESM) and its feedback
- ESM might be used to create awareness, enhance insight and self-management, personalize interventions, and provide alerts
- Potential undesirable effects include negative reactivity to the assessments, illness reinforcement, and participant burden
- To implement ESM in psychiatric care, collaboration, shared data access, attention for motivation, and clinician training are essential

Abstract

Objective: The current qualitative study aimed to map the relevance of the experience sampling method (ESM) for psychiatric practice and identify barriers and facilitators for implementation, as perceived by patients and clinicians.

Methods: Participants were 22 patients with various diagnoses and 21 clinicians (e.g., psychiatrists, psychologists) who participated in interviews or focus groups. Using Atlas.TI, qualitative thematic analysis was conducted to analyze the transcripts, resulting in four themes: 1) applications, 2) advantages, 3) undesirable effects, and 4) requirements for implementation of ESM in care.

Results: Clinicians and patients believed ESM could be relevant in every phase of care to increase patients' awareness, insight and self-management, personalize interventions, and alert patients to rising symptoms. Further, ESM was expected to improve the patient-clinician relationship, lead to objective, personalized, reliable and visual data, and increase efficiency of care. However, participants warned against high assessment burden and potential symptom worsening.

Conclusions: This study provides first evidence that the potential of ESM is recognized by both patients and clinicians. Key recommendations for optimal implementation of ESM in psychiatric care include flexible application of ESM, collaboration between patient and clinician, regular evaluation, awareness of negative reactivity, availability to patients with different psychiatric syndromes, and implementation by an interdisciplinary team of patients, clinicians, researchers, and information technology specialists.

Keywords: experience sampling methodology, ecological momentary assessment, clinical practice, psychiatric care, implementation

Introduction

The experience sampling method (ESM) receives increasing attention in psychiatry and holds the promise to greatly advance personalized health care (1). ESM involves the repeated sampling of people's moods, symptoms, experiences, behaviors, and contexts (2). Research has thus far applied ESM to elucidate the daily life dynamics of a myriad of psychiatric disorders (3). Because ESM entails intensive self-monitoring and the resulting data can reveal individual models of associations among daily life experiences, ESM is assumed to also have relevance for psychiatric practice (4).

Although monitoring in itself may already benefit emotional self-awareness (5, 6), supplementing ESM monitoring with personalized feedback might improve feelings of empowerment (7) and even symptoms (8), suggesting potential usefulness for both patients and clinicians. Indeed, researchers believe that ESM may provide micro-level information, difficult to catch by clinical impression, that can add to processes of diagnostics, treatment choice, and relapse prevention (9, 10). However, the general assumption that ESM can be of value to psychiatric care lacks a solid evidence base, and it remains unclear how and when ESM should be applied. Thus far, ESM in research was often of short duration (e.g., 5-14 days) with intensive sampling (3-10 times a day) and without personalized feedback (11). In clinical practice, ESM can be expected to require a different form (8).

For health care innovations to be effectively introduced in clinical practice, premier stakeholders need to be included and barriers to implementation addressed beforehand (12). This requires a currently unavailable in-depth qualitative study into the views of patients and clinicians on the opportunities of ESM for psychiatry. Only one qualitative study reported that patients with psychosis recognized the advantages of ESM, but did not include clinician views (13). Although patients will be the primary users of ESM, clinicians might be important stakeholders in introducing ESM, and might use ESM themselves to inform treatment decisions (9, 14). Therefore, the present study is the first to 1) map the relevance of ESM for psychiatric practice and 2) inquire into barriers and facilitators for implementation through focus groups and interviews with patients and clinicians.

Methods

Participants

Reporting of this study is done according to the Standards for Reporting Qualitative Research (15). Participants were psychiatric patients and clinicians. Patients received mental health care during the study or in the recent past. Clinicians were psychiatrists, psychologists, psychiatric nurses, or job coaches. Participants were selected with the aim of achieving maximum variation on age, gender, diagnosis (if patient), experience with ESM and/or mobile technology, and affinity with research. Participants were recruited through posters and contacts at mental health institutions until no new information was heard (data saturation). After they signed up, participants were approached through e-mail to provide more information on the study. They were also invited (but not required) to participate in an open-source ESM study (16), to try out ESM before participation.

Of the 31 patients who signed up for participation, 22 showed up and provided informed consent. The remaining 9 did not provide reasons for the no-show. Of the 23 approached clinicians, 21 clinicians showed up and provided informed consent. The remaining 2 clinicians were unable to participate because of time constraints. The institutional review board approved of the study.

Interviewers

Interviews were conducted by authors XX (degree, gender) and XX (degree, gender). Both were trained in qualitative interviewing and analysis. Focus groups were conducted by XX as moderator, with assistance of XX (degree, gender) or XX. There was no contact between researchers and patients before the study. XX and XX knew some of the clinicians.

Interviews and focus groups

Interviews (on average 57 minutes) and focus groups (92 minutes) were conducted in several mental health care institutions and private practices in XXX between June 2016 and February 2017. One focus group participant was later individually interviewed to elaborate on a potential downside of ESM she was reluctant to share in the focus group. Interviewers explained the study rationale and

what ESM entails (see Online Supplement). ESM was explained as a method by which individuals can record their moods, experiences, behaviors, contexts, and thoughts multiple times per day on their smart phones (2). Example items (e.g., "I feel relaxed") and possible ESM-derived feedback were shown, such as mood variation, mood during activities, and associations between mood and behavior (16).

A semi-structured interview guide was used to ask open questions (see Online Supplement), covering 1) the usefulness of ESM in general and specific phases of care, 2) possible consequences of using ESM, 3) implementation in care, and 4) design of the ESM protocol. Example questions include: "What do you think of ESM?", "How do you view the implementation of ESM in clinical care?" and "Do you see possible risks or downsides to ESM?" All interviews and focus groups were audio-recorded and field notes were made.

Data analysis

The digital audio recording of each interview and focus group was transcribed verbatim. Thematic analysis was applied by XX and XX according to the Qualitative Analysis Guide of Leuven (17). This approach involves the identification of central themes in the transcripts, which are iteratively verified against the data.

First, all transcripts were summarized in conceptual interview schemes and narrative reports to gain a holistic understanding of the participants' experiences. Next, a concept code list was constructed based on subthemes identified in the data (e.g., time-investment). XX and XX used this code list to independently code the transcripts in Atlas.TI (version 8). Throughout this first round of coding, new codes were created when previously unidentified themes were encountered, and existing codes were more clearly defined through consensus. Hereafter, the code list was finalized and used in a second round of coding.

The codes were grouped in four overarching coding categories or central themes. These central themes were verified against all transcripts and discussed with XX and XX. Participants were invited to provide feedback on a summary of the central themes.

Results

Four themes were identified (see Figure 1). Participant characteristics are described in Table 1. For illustrative quotes related to the themes, see Table 2 and 3.

Theme 1: Applications

Most patients and clinicians believed ESM could be applied flexibly in every phase of care, from diagnosis to relapse prevention, depending on the patients' care needs. First, by monitoring symptoms, experiences, and contexts multiple times a day, many patients and clinicians suggested that ESM could be used to help the patient focus on the present and increase real-time awareness of what influences their symptoms.

Second, all patients and clinicians believed that ESM and ESM-derived feedback (see Figure 2) could offer relevant insights on 1) the severity of symptoms and variation therein, 2) short- and long-term associations between symptoms, experiences, behavior, context, medication, drugs, and life events, 3) symptom reduction, and 4) patterns building up to symptoms in smaller time-windows (e.g. panic attack) or larger ones (e.g. depressive episode). As such, most patients and clinicians believed that ESM could be applied to strengthen patients' self-management by providing them with concrete insights on how to cope with their symptoms.

Patients and clinicians also discussed employing ESM to determine intervention effects, thereby guiding decisions regarding future course of treatment. The majority of patients and clinicians suggested that the personalized nature of ESM has the potential to convince patients to start or continue interventions or behaviors if ESM-derived personalized feedback demonstrates its effectiveness.

Finally, multiple patients mentioned ESM might be used to alert patients and their clinicians of elevated ESM scores. Several patients argued that such alerts could help them notice the beginning of a downward spiral and could easily update clinicians on how they are doing. Possibly, (personalized) therapeutic advice could be attached to these alerts, to help patients directly alleviate

symptoms and practice treatment strategies in daily life. However, several clinicians were hesitant of the possibility of receiving alerts, worrying about patient safety, responsibility, and time constraints.

Theme 2: Advantages

Patients and clinicians identified several advantages of ESM for clinical practice. First, ESM may benefit the clinician-patient relationship by providing a framework for shared decision making. Multiple patients indicated that ESM may help articulate their experiences, consequently making them feel more heard and understood. As such, ESM was believed to lead to better mutual understanding between patient and clinician and provide a larger role for the patient perspective.

Second, ESM was generally seen as resulting in data that is 'personalized', 'neutral', 'objective' and 'nonjudgmental'. These characteristics of ESM were contrasted to receiving explicit advice or insights from clinicians, which patients do not always accept. Personalized and objective ESM data was perceived as convincing and seen as the key to gaining insight and changing behavior, especially if the interpretation of ESM-derived feedback is not imposed on patients by clinicians.

Third, the majority of patients and clinicians believed that ESM provides a more reliable overview of a given period than asking the patient or administering a retrospective questionnaire. These patients indicated a difficulty in stating how they have felt since the previous session, which is often influenced by current mood. Some clinicians and patients with bipolar disorder mentioned that ESM also maps mood fluctuations more accurately than once-a-day mood questionnaires such as the LifeChart (18).

Fourth, many patients and clinicians expected ESM to result in novel information because ESM 1) has more items than traditional registration strategies and focuses more on mood, experiences, behavior, and context rather than symptoms alone, 2) illuminates the time between treatment sessions, otherwise difficult to capture, 3) may lower the threshold to disclose sensitive information, and 4) offers the possibility of automatically generated models of symptoms and contexts (e.g., network analysis) otherwise unavailable to patients and clinicians. This may also enhance efficiency according to some patients, because problem areas can be found faster with ESM than with current, mostly retrospective, methods.

Fifth, some clinicians mentioned that the visual nature of ESM-derived feedback may help explicating associations normally verbally discussed in therapy.

Sixth, clinicians and patients expected smartphone-based ESM assessments to be less burdensome than paper-and-pencil registration, and less easily forgotten because patients are reminded through prompts. Some clinicians speculated that ESM may bring psychiatric care more 'up-to-date', thereby increasing resonance with patients' everyday environments.

Finally, some patients expected to enjoy the very process of monitoring, learning about themselves through ESM-derived feedback, and checking whether certain expectations are reflected in the data.

Theme 3. Undesirable effects and limitations

Patients and clinicians identified several potential undesirable effects and limitations of ESM monitoring or feedback. First, several patients and clinicians indicated that ESM could be burdensome when 1) assessments are too frequent or too long in duration, 2) assessments interfere with patients' activities, 3) patients already complete other questionnaires, 4) patients have to type in entries, and 5) ESM items are irrelevant to the patient. Burden was suggested to be reduced by clear delineation of the assessment period and letting the patient choose the timing and focus of the assessments.

Many patients and some clinicians feared that ESM monitoring will negatively influence patients' wellbeing or worsen symptoms. Some patients mentioned they might start dreading the assessments or feel guilty and incompetent if they miss assessments. Further, some participants mentioned that ESM may keep reminding patients of their symptoms rather than what goes well, which may worsen symptomatology, but could also help them acknowledge and handle their situation. Other plausible negative influences that were mentioned by one of the clinicians were 1) ESM monitoring becoming a ritual, 2) a constant focus on themselves rather than getting help, and 3) too much emphasis on symptom scores instead of the meaning of symptoms. Negative reactivity was suggested to be partially resolved by asking more neutral or positive questions.

Most patients and clinicians did not believe ESM-derived feedback will have negative consequences, but mentioned that these may arise when 1) patients do not recognize themselves in the

results, 2) ESM data does not reveal clear patterns, confirming patients' ideas that 'it does not matter what I do', or 3) important associations are uncovered, but impossible or difficult to change. Generally, clinicians believed it to be their task as a professional to help patients cope with these consequences, and indicated that this could also be a helpful learning process. Some clinicians warned for too high expectations of the relevance of ESM for clinical practice, emphasizing that it is only a tool and will not drastically change psychiatric care.

ESM was perceived to be applicable to all types of psychiatric syndromes, but some clinicians speculated it to be less suitable for 1) patients with limited insight in their symptoms (e.g., young children, patients with autism), 2) patients who prefer pills over psychological treatment, 3) patients with lower intelligence, 4) patients less comfortable with technology, 5) patients with insufficient mastery of the assessment language, 6) patients with neurocognitive deficits, 7) patients who keep asking for reassurance, and 8) psychotic patients for whom phone use may increase paranoia. Clinicians disagreed on the risks of ESM for patients with personality disorders, suicidal ideation, alcohol or substance use disorders, somatic symptom disorder and obsessive-compulsive disorder, wondering whether a constant focus on their symptoms worsens them.

Theme 4. Requirements for implementation

Several requirements for smooth implementation of ESM in clinical practice were described. First, all patients and clinicians agreed that ESM should be a collaborative process, where patients and clinicians decide together on 1) the relevance and feasibility of ESM, 2) clinician access to the data, 3) desirability of patient and clinician alerts 4) relevant items, 5) the frequency and duration of assessments, and 6) the interpretation of ESM-derived feedback. If not regularly evaluated, ESM might lose its advantages. Patients preferred ESM-derived feedback to be discussed by mental health professionals with whom they have a long-standing relationship, such as psychiatric nurses or experts by experience.

Further, it was generally viewed that both patients and clinicians should have access to the patient's ESM data, and both should have a role in deciding when it is examined. Several patients assumed they will be the owner of their data, and that they can decide whether or not to share those

data with others. Ideally, patients wanted to be able to initiate ESM monitoring themselves, but also recognized that without clinician involvement, ESM will be less effective in gaining insights and changing behavior. Some clinicians imagined that direct access to the data (not via the patient) is necessary to integrate ESM in treatment. However, some clinicians were concerned that continuous access to the patient's ESM data may enhance the power imbalance between the two. They further underscored that they cannot be expected to constantly monitor the data and act on elevated scores.

Third, a number of patients and clinicians stressed that ESM should never replace face-to-face contact. Contact with clinicians should not solely depend on ESM scores, and patients should be encouraged to ask for help directly rather than through ESM.

Fourth, a number of clinicians discussed how patients could be kept motivated. This starts with a proper rationale and patient input on relevant constructs. Some clinicians believed that certain patients will be sufficiently curious or in such distress that this in itself motivates them for ESM. Others argued that patients will need appropriate reward for their efforts, e.g. by continuous ESM-derived feedback, focusing on positive experiences, and giving advice and compliments. Motivation was believed to disappear if clinicians do not discuss feedback or when the patient has gained sufficient insights from ESM.

Fifth, several clinicians wanted to receive training on potential threats to the validity of ESM-derived feedback and the selection of the proper ESM protocol. This includes research-guided information on item formulation, assessment frequency and duration, minimum number of assessments, and feedback interpretation.

Finally, many patients and clinicians highlighted the limited time of clinicians, and indicated that user-friendly software and reimbursement from insurance companies might help clinicians to incorporate ESM in care.

Discussion

Main findings

The present qualitative study aimed to gain an in-depth understanding of 1) the relevance of ESM for psychiatric practice and 2) barriers and facilitators for implementation. Importantly, clinicians and patients recognized many of the applications and advantages of ESM also highlighted in research, such as the monitoring of treatment effects (19), the beneficial effects on awareness (5) and empowerment (7), the potential for shared-decision making (20), the increased reliability of the data compared to traditional assessment methods (21), and the possibility of real-time alerts on elevated scores (22). The present study provides first evidence that these applications and advantages of ESM are indeed desired in practice. Our findings contrast to those of a previous qualitative study, which reported that although patients recognized the benefits of ESM, they were unsure of its relevance for their own situation (13). However, the aforementioned study was limited to one specific 6-day application of ESM (without feedback) for a specific patient group (psychosis) and did not include the perspective of clinicians, which may explain the differing results.

Patients and clinicians stressed that successful use of ESM will depend on the active involvement of patients in the selection of the ESM protocol, interpretation of ESM-derived feedback, and subsequent action taken based on ESM. They further emphasized that the specific application of ESM should vary across treatment phases according to the patient's care needs. The need for clear agreements on data access became especially apparent when discussing real-time alerts. Although desired by patients, both patients and clinicians feared potentially adverse situations caused by not knowing whether the data were viewed and acted upon. Our findings are in line with research showing that tailored care and shared-decision making may improve patient satisfaction, treatment adherence, and health status (23). They further highlight that patient involvement and flexible application are crucial factors for implementation of ESM.

Both patients and clinicians mentioned symptom worsening as a potential undesirable effect of ESM, because ESM may continuously make patients aware of their symptoms. However, studies among patients with substance abuse or pain disorder found little evidence of such negative reactivity

in short-term ESM (24, 25); in fact, studies in psychiatric patients so far only reported favorable effects of self-monitoring (5, 8). Reactivity might vary according to specific patient characteristics, such as symptom severity, neuroticism, or readiness for change (26, 27). When implementing ESM in practice, reactivity will need to be controlled, as is also common practice in research settings, through careful construction and ordering of the items (3). Nonetheless, some patients and clinicians worried that monitoring in itself might fixate patients on their illness, thereby hampering their autonomy. By providing constant reminders of their patient status, ESM walks a fine line between improving self-management and undermining it (28). This potential downside was suggested to occur regardless of item content, and although ESM is suggested to benefit patient empowerment (7), future research will have to show for whom and under what circumstances this holds true.

General consensus was that most patients could benefit from ESM. However, clinicians expected that ESM might be less useful for patients with autism, paranoia, or substance abuse. Interestingly, patients themselves believed ESM could be relevant for all psychiatric syndromes, as is supported by research (3, 29). This suggests that the potential of ESM is not so much dependent on psychiatric syndrome, but rather on the willingness of the patient.

Finally, patients and clinicians highlighted that clinician training and research-guided advice are essential to guarantee the validity of ESM and minimize potential undesirable effects. These recommendations and our experiences with using ESM in practice have led us to believe that actual implementation of ESM can only be realized when researchers provide a framework that 1) translates clinical hypotheses to ESM protocols, 2) ensures that these protocols meet the strict rules also applied in research (27), and 3) provides valid interpretation of ESM-derived feedback.

Strengths of the current study include the in-depth nature of the interviews and focus groups, and the large and diverse participant sample, varying on age, gender, occupation, diagnosis, discipline, and experience with mobile technology. Further, by exploring the views of two premier stakeholders (patients and clinicians), our qualitative approach allowed us to formulate key recommendations on the utility and implementation of ESM.

In contrast to quantitative research, the goal of qualitative research is not to generalize but to describe and understand phenomena that may be time- and context-specific. As such, generalizing the

results to other settings than XX Country should be done with caution. Furthermore, (most) participants in our study were asked to envision on the role of ESM in clinical care without having used the method; experiencing ESM might offer different results. Finally, most patients had mood disorders. Envisioned advantages and applications may differ for patients with other types of disorders.

Conclusion

This study provides first evidence that the relevance of ESM for psychiatric care is recognized by both patients and clinicians. Key recommendations for the optimal implementation of ESM based on this qualitative study are presented below. If these recommendations are followed, ESM might very well deliver on its promise for psychiatric care.

1. Patients and clinicians should apply ESM flexibly (across care phases) and collaboratively.
2. Clinicians should make clear agreements with patients on data access.
3. Patients and clinicians should be aware of possible negative reactivity to ESM assessments.
4. Patients and clinicians should regularly evaluate whether ESM helps or hinders patient self-management.
5. ESM should be applied to all psychiatric syndromes and no patient group should be excluded a priori.
6. ESM needs to be implemented by an interdisciplinary team of patients, clinicians, researchers, and IT-specialists.

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Figure legends

Figure 1. Schematic overview of all themes, theme 1 (applications), theme 2 (advantages), theme 3 (undesirable effects and limitations), and theme 4 (requirements for implementation).

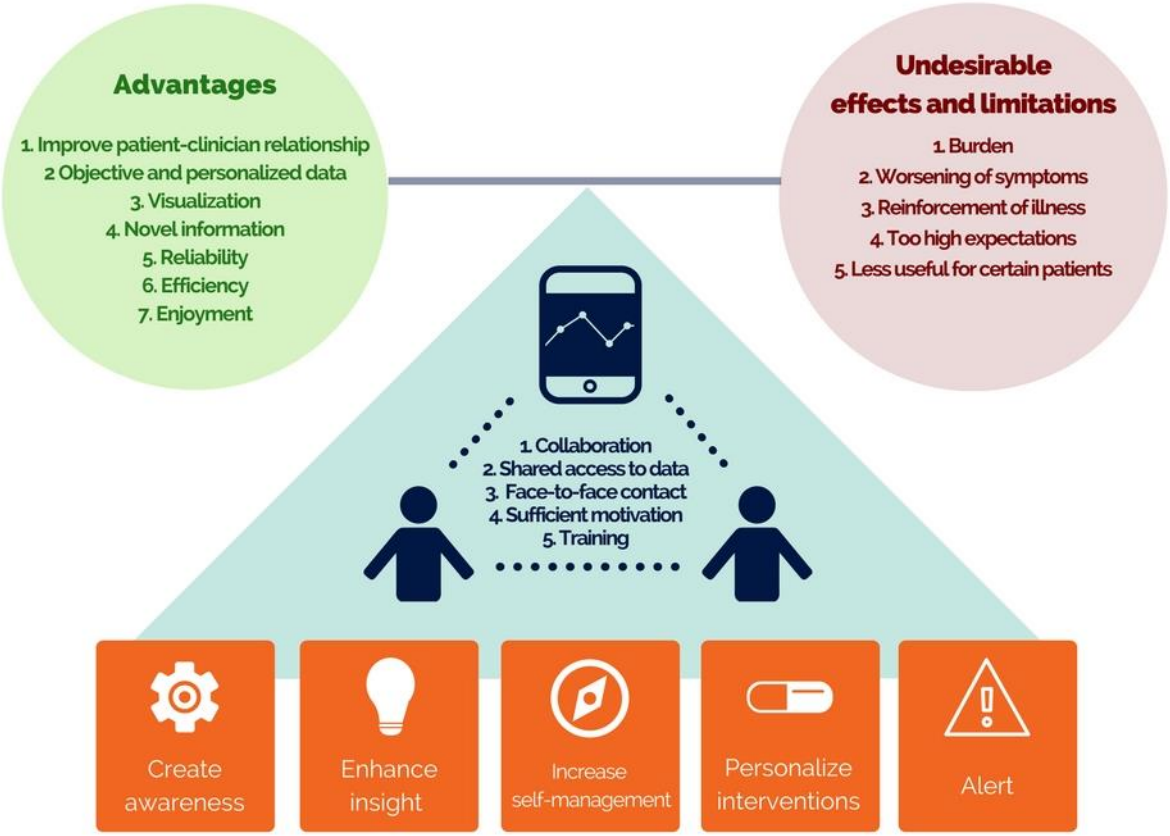

Figure 2. Examples of ESM items and ESM-derived feedback that were shown to participants.

Note. Examples adapted from the HowNutsAreTheDutch study(16).

Table 1. Demographic and clinical characteristics of patients (N=22) and clinicians (N=21).

	Patients	Clinicians
Gender		
Male	8	13
Female	14	8
Age		
20-35	6	8
36-50	7	8
51-65	7	5
66 or older	2	0
Experience with ESM		
No previous experience with ESM	16	17
Started participation in ESM try-out study	6	4
Used ESM in clinical practice	0	0
Education level		
Higher education	12	
Secondary vocational education	9	
High school	1	
Profession		
Psychiatrist		4
Psychologist		13
Psychiatric nurse		3
Job coach		1
Self-reported diagnosis		
Depression	10	
Bipolar disorder	7	
Anxiety disorder	4	
Psychosis	3	
Eating disorder	1	
Autism spectrum disorder	1	
Unknown	1	
Years in treatment		
<1 year	4	
1-5 years	8	
>5 years	8	
Unknown	2	

Note. Most patients indicated multiple diagnoses. ESM = experience sampling method.

Table 2. Quotes related to theme 1 (applications) and theme 2 (advantages).

Theme	Quote
1. Applications	Well, actually I just wanted to react, because when you get a sms like that, that says, 'what have you done the past part of the day?', then you can really make a connection between your mood and what you are doing. For example if you, when you've been outdoors, or have met people, are energetic and happy because of that. Or, if that morning it happens to be the case that: 'I have not seen anyone, I am on my own at the computer, I am completely run down and irritable'. So a connection could very well be made between loneliness, or being alone, and a bad mood. That is of course very interesting. And also, the time of the day. It could well be that you are generally just a lot more energetic and cheerful in the afternoon than in the morning. And then you could also be able to make connections between... Well, that is very interesting. (male patient in his fifties, ID15)
2. Applications	Because of that he also becomes more active in his own process and maybe also in his own mental state. And I think he is explicitly challenged to start making connections. That almost doesn't happen now. Now he is in a kind of, almost in a kind of depressed vacuum you know? Where really nearly everything is hidden under the mist [...] Get some nuance in the day. If you don't have an eye for that, then at the end of the day (…) it can indeed just seem very bleak, seem like a flat line, while, in terms of measurements, you can observe nuances in there. (male psychologist in his sixties, ID37)
3. Applications	Yes, if for example you've filled in the whole week: 'I think life isn't worth living', that it then sends a signal and that an action like that might be taken. Because, well, what << ID9 >> already said, eventually you have reached a point that you don't ... that you can't fill in a list like that anymore. But I think that for a lot of people you can already somewhat notice that things are really going completely wrong. (female patient in her twenties, ID12)
4. Advantages	ID14: But what you said about, if you ... Look if you know that this app [ESM] is available, that does not mean that you will always use it. But when you think to yourself, hey, I think that I am doing a bit worse, you can start using the app again at that moment. To get some clarity on, well, how am I actually doing? Then you can ... ID17: Then you do not have to be dependent on your clinician. (female patient in her fifties) ID14: Yes, then you can indeed really put it to good use as a tool for yourself. (female patient in her sixties)
5. Advantages	I think that for me it might result in me thinking: well, maybe I should try more to do something creative during the rest of the week, because apparently that helps me. Apparently it calms me down, I can relax more. So it can give you some insight into activities that you can undertake. (female patient in her forties, ID7)
6. Advantages	Furthermore, what does get me enthusiastic, is the fact that a kind of network analysis is possible. How precisely that would go, I don't know. But I do think that you would often come up short with two people. In your knowledge, or in seeing connections. And if a bit of statistics can assist with that, then that is really good. It was almost a holistic theory, the way it was set out on paper. Those networks and so on. So diagnostically that could be very interesting. That you discover things, for example, which you at first you did not see at all. Like, if that, and that, that then it leads to that. And that then leads to something else. Well, that's fascinating. (male psychologist in his thirties, ID40)

Table 3. Quotes related to theme 3 (adverse effects) and theme 4 (requirements for implementation).

Theme	Quote
1. Negative consequences	I think the risk is that we will start hoping, or expect that the therapies will become more effective or something like that. But I am afraid that it isn't going to be like that....Something new hits the market and then all the attention is focused on it and all of a sudden everyone will have to do it. And then the insurers will back it. And then we all have to apply it. And that is a bit of a recurring wave in the whole health care system; that we then expect that this is going to do it. But I remain convinced that those kind of basic factors like motivation, discipline, mental distress and so on, that those will remain decisive for the success of therapy and not this kind of thing. (male psychologist in his thirties, ID40)
2. Negative consequences	What I have noticed, and that's a bit of a drawback, is that each time there is a questions like 'I am tired', I discovered that I am actually always tired and I hadn't really expected that. I wasn't really aware of that. So since those questions I am much more aware, but now it also bothers me more. If I hadn't been made aware of it, I think it would not have bothered me so much. It is the other way around with other questions. It is also a bit more positive, 'oh how nice that I do still have that'. So there is that, but as far as tiredness goes, I really do think: 'yes, since I have been filling that in I actually noticed it'. (female patient in her forties, ID22)
3. Requirements for implementation	Do you also include that it is a real issue? That for us it is not always really medical but it can be a very important contribution to our own sense of being in control of things. And that not everyone is used to that, so you have to be taught that, you have to be guided along in that, be guided along positively. That it is important that the therapist realises that. They do not have to do that all themselves, because some things you can delegate to other members of staff. But that even when you think, 'I can't take it anymore' that then a therapist just says: 'look, this is what you did it for.' (female patient in the sixties, ID2)
4. Requirements for implementation	And I myself would not readily check it, irrespective of the patient. Because what would I do with it? As the therapist I can't interpret it. Because if this profile is the outcome for you, it means something different when it is the outcome for me. INT: So, you should also do that interpretation with that person? R: Yes, I think so, yes. Really it belongs to the patient, but it can help me as a therapist to have the conversation with the patient. (female psychiatric nurse in her forties, ID43)
5. Requirements for implementation	So, how nice would it be if you could show a fantastic graph of the past months? That you can say to someone, just look at how you have filled it all in. So it should also be user-friendly for the therapist who can easily magic it up on his screen. That sort of thing is also a reward. (male psychiatrist in his forties, ID24)
6. Requirements for implementation	ID25: Yes, but it is very strongly a case of garbage in, garbage out, so when you put rubbish in..... ID24: You get rubbish out. (male psychiatrist in his forties) ID25: Then you get rubbish out, and then you either see nothing, or you see things that are not right. So you have to carefully define what you are putting in before you put someone to work with it. And potentially it might not have any effect or even adverse effects. But I don't think anybody knows that. (male psychiatrist in his fifties)

Supplementary materials for:

Insights of patients and clinicians on the promise of the experience sampling method for psychiatric care

Description of the experience sampling method (ESM) to participants

The description of ESM was the same for all participants (patients and clinicians), whether they participated in focus groups or interviews. A PowerPoint presentation or handouts were used to show examples of items, delivery format, and ESM-derived feedback (summarized in Figure 2 in the main article).

ESM was explained as a method by which patients can record their moods, experiences, psychological/physical complaints, behaviors, experiences, activities, contexts, thoughts, or anything else of importance several times a day. Many participants were familiar with retrospective questionnaires in the context of treatment, such as the quick inventory of depressive symptomatology (QIDS). To contrast ESM to such questionnaires, we mentioned that most ESM studies so far had given prompts 3-10 times a day, but that the questionnaires took less time to answer (e.g., 1-2 minutes). Further, it was emphasized that ESM questions pertain to the present moment and not to longer periods (e.g., days/weeks/months). We also mentioned that patients could participate in ESM for as long as they wanted, ranging from days to months.

Regarding the content of ESM, a couple of example items were shown for clarity (e.g., I feel relaxed, I am upset, I experience physical complaints, I worry), but it was stressed that everything was possible here as long as items pertained to the present moment or the last couple of hours. If participants offered suggestions of things they wanted to measure, interviewers discussed if and how this was an appropriate ESM item.

Practically, we explained that participants would receive a text message on their smart phones with a link to the questionnaire and that they could use a slider to indicate the level of agreement to the items. Items were answered using a visual analogue scale, ranging from 0 (‘not at all’) to 100 (‘very much’). We explained that, in the example study (HowNutsAreTheDutch), participants had one hour to complete the questionnaire, but that this could be a shorter or longer period.

After it was clear that participants understood the concept of ESM, and that all parameters (item content, schedule, measurement period, use in practice etc.) were subject to discussion, we showed several examples of graphical feedback (see Figure 2 in the main article). To briefly summarize, these feedback examples showed fluctuations in mood, mood patterns,

frequency of activities, mood during activities, and associations between experiences/complaints in a network. The interviewers stressed that both the content and the graphical display of the feedback were subject to discussion.

Example ESM study (HowNutsAreTheDutch)

All patients and clinicians were invited (but not required) to participate in an open-source ESM study called HowNutsAreTheDutch (www.hoegekis.nl (1)). This invitation was intended to give participants an idea of what ESM could look like. In the HowNutsAreTheDutch study, participants complete assessments three times a day for thirty days on their own smart phones, after which they receive automated personalized feedback (see Figure 2 in the main article). Focus groups consisted of a mix of individuals that started the HowNutsAreTheDutch study (27% of patients and 19% of clinicians) and individuals with no previous knowledge about ESM. Given the short try-out period (most individuals started the HowNutsAreTheDutch study only a few days prior to the interview or focus group), responses to the interview and focus group questions were largely similar for patients and clinicians that did versus did not try out ESM. Further, this study's main focus of interest was the use of ESM in clinical practice, which was hypothetical for all participants.

Interview questions

After the introduction, participants were asked the questions outlined below, not necessarily in this order. Participants could also raise the topic themselves and prompts were used to gain a detailed understanding of participants' thoughts (2, 3).

Question	Specific prompts
1. What do you think of ESM?	
2. To what extent would you use ESM yourself?	How?
3. What could be possible consequences of using ESM?	
4. Do you see possible risks or downsides to ESM?	
5. *Patients*: do you have an example of when you would use ESM yourself? *Clinicians*: do you have an example of a patient where you could use ESM?	
6. *Clinicians*: are there patients where you would decide against using ESM?	What kind of patients? Why?
7. *Patients*: would the way you get mental health care change through ESM? *Clinicians*: would the way you give mental health care change through ESM?	How?

8. How do you view the implementation of ESM in mental health care?	Could you identify pitfalls?
9. What would you want to do with ESM-derived feedback?	
10. *Patients:* How would you want to receive ESM-derived feedback? *Clinicians:* How would you discuss the ESM-derived feedback?	*Patients:* Do you discuss it with your clinician or not? How?
11. What kind of questions would you want to ask in the ESM-diaries?	
12. What kind of clinical questions could you answer with ESM?	

Note: examples of generic prompts: "what does […] mean for you?", "can you elaborate?", "what do you mean by […]?", "can you give an example of […]?"

References

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